Lat 39.60775 Lon -120.22768

United States Department of Agriculture | Forest Service | Lassen NF

Reply To: 3420 Date: September 30, 1994

Subject: Insect and Disease Input to the Cottonwood EIS (NE94-1)

To: Forest Supervisor, Tahoe NF

On July 11, 1994 Ralph Meinel and I visited Eastside pine stands on the Sierraville Ranger District. The purpose of the trip was to acquaint me with the area so that I could provide insect and disease input to the Eastside Ecosystem Management EIS the District was preparing. During the trip we discussed the role of fire in the Eastside ecosystems and that fire has been restricted in these ecosystems since the turn of the century. As fate would have it, fire revisited the area in the form of the massive Cottonwood Fire.

As a result, the project was renamed the "Cottonwood Burn EIS". On the surface, the emphasis seems to be focusing on the burn. However, I assume we are still addressing "ecosystem management". Most of my input will address forest health and ecosystem management.

Much of the Eastside forest I viewed appeared overstocked. This condition stresses trees and invites insect attack. Trees stressed by root disease, dwarf mistletoe, and insect attack coupled with drought often die, as a result of the combined stress. This mortality was evident in many of the stands with a large white fir component on the Eastside of the Sierraville RD.

For undamaged trees, the burn has the general effect of increasing vigor through nutrient release and stand thinning. However, there will still be clumps of trees, or whole stands that escaped death and remain overstocked and possibly damaged from the heat.

For treatment purposes, it is a good idea to stratify the area into management categories such as 'commercial forest', 'recreation/admin sites', and 'other forest'. The commercial forest could be treated silviculturally to increase vigor of surviving stands and to salvage and regenerate burned stands. The recreation/admin sites could be treated with higher cost treatments depending on the value of the trees (ie. trees could be sprayed to ward off bark beetle attack). The other forest might be salvaged or left untreated.

In planning future treatments for the burn, it is important to realize that the current state of the stands is a result of what we did (or didn't do) to the stands prior to the burn. In other words, these stands are where they are now, because of how we have managed them. We should evaluate our past management, in looking at today's results. And use this information to get to a "desired future condition".

If the stands were "destroyed" (in our view), then chances are they had a large amount of dry biomass prior to the fire. Much of this might have been in the form of mortality that resulted from insect or disease-stressed trees and the drought. In other areas, much of this biomass might have been in overstocked understory trees that normally would have been removed by reoccurring underburns. Still other stands might have been overstocked mature trees that hadn't been impacted by insect or disease events.

We might want to look at stands that were not "destroyed" and see why not. It might have been chance. Or, it might have been a result of how we managed the stand (or surrounding stands). If the latter, and if we want to repeat this success in the future, then we might elect to continue this management on this and other stands. I use the word "success" because the Eastside pine stands are said to have had a high fire frequency prior to management.

Insect and Disease Impacts

In selecting management alternatives, we must consider the insects and diseases that might have an impact on the stands. In the burn, the main insects and diseases to be concerned about at this time are:

- blue stain
- flatheaded borers
- bark beetles
- dwarf mistletoe
- fomes root disease

Commercial Forest

If we are working in the 'commercial forest' and we wish to harvest timber for lumber, time is critical. In less than a year, blue stain fungi can colonize dead trees and degrade the lumber value significantly. Flatheaded borers will also rapidly infest dead wood. When we are considering salvaging large volumes of lumber, such as from the Cottonwood Burn, value loss is considerable. A one to two year delay in harvesting, say 100,000 mbf, could reduce the value $200/mbf and result in $20,000,000 lost revenue from degraded lumber.

In dealing with fire damaged trees, it is often hard, if not impossible to predict which trees will live and which will die. This determination is most important when stipulations are made to "harvest only fire killed trees". If we are managing the stands for a desired future condition that allows for thinning damaged or poor formed green trees to reach that condition, the selection of "dead" green trees is not so critical.

Since it will probably become necessary to predict which trees will die from fire damage, I suggest using Willis Wagner's 1960 publication "Estimating Survival of Fire Scorched Timber in California".

When considering injured or overstocked escape trees, it is important to lower the stress on the leave trees. Bark beetles will attack weakened trees, whether the stress is from fire damage, overstocking, and/or drought. If weakened trees are successfully infested with bark beetles, then the next generation of beetles will emerge and can target healthy trees up to 25 feet from the brood tree.

Therefore, it is important to remove as many weakened trees as possible to increase the vigor of a stand so that it can best ward off beetle attacks. Of course, the manager needs to decide how much future mortality is desirable. If snag recruitment, for example is important, then stressed trees might be left for that purpose.

Dwarf mistletoe is prevalent in the Cottonwood burn area. Reoccuring fires, probably helped control dwarf mistletoe in the past. By excluding fire we have encouraged dwarf mistletoe to proliferate. Dwarf mistletoe probably always existed in the area...only less abundantly. Frequent underburns probably killed infected branches and brooms. They also would destroy heavily infested groups of trees that developed large amounts of dead biomass.

When dealing with dwarf mistletoe in the commercial forest, it is usually not practical to eradicate the disease by clearcutting an replanting. The alternative is to work "with" the organism as nature does. Dwarf mistletoe is a slow spreading parasitic plant that weakens and sometimes kills trees. Because it spreads by "shooting" its seeds onto nearby foliage, it is not wise to plant trees of the same species under dwarf mistletoe infested trees. If this is done, then the overstory must be removed before the seedlings grow to be a large target for the shooting mistletoe seeds.

It is advisable to examine infested stands to monitor the dwarf mistletoe progress and to prescribe treatment. Prescribed underburning is being used some to reduce fuel loading. This burning could help to control dwarf mistletoe. It would be good to examine areas of the Cottonwood Burn where mistletoe exists, and to evaluate the effect the fire had on the health of the stands with respect to this organism. Then to use this information in prescribing future underburning. Forest pest management (FPM) funds can be requested for this purpose.

When harvesting trees in the Cottonwood Burn, it is important to apply Borax to the freshly cut stumps to prevent introducing Fomes root disease to the harvested stands. Borax should be applied to both fir and pine stumps. There is a standard Timber Sale Contract provisions for this. The minimum diameter of stump to treat can vary. The Lassen NF treats down to 8" stump diameter. Some research suggests 12-16" minimum diameters. If stumps are sheared/cut ground level, I would recommend at least 12". If they are in an opening where the stumps can dry rapidly, 16" might be used. An exception to boraxing might occur if a species, such as fir, is considered not to be a part of the desired future condition for a stand. In that case, the decision might be made not to borax the unwanted species.

In addition to the insects and diseases, animals need to be considered when prescribing treatment. Pocket gophers, deer, rabbits, and porcupines can have big impacts on developing plantations. Often, newly planted seedlings are the "choicest" food available to these mammals. Artificial control might be appropriate.

Recreation/Admin Sites

When we are dealing with "high value" trees, for aesthetic reasons, other more costly treatments might be considered. For example, there are protective sprays that can be applied to individual trees to prevent bark beetle attacks.

Carboryl is one such compound that is registered for this use. Campgrounds fall under a categorical exclusion that permits this treatment without an EA or EIS.

Campgrounds might merit other higher cost treatments. Larger trees might be transplanted to provide a forested look in a shorter time.

It is necessary to consider tree stress in recreational sites. Historically, we tend to leave these areas overstocked because we want screening. Or, we like the look of all the old growth. Stressed trees in campgrounds are subject to attack by many organisms. Often, the resulting mortality occurs in trees we wouldn't have chose and in greater numbers. It is advisable to use silviculturists in preparing vegetation management plans for recreation areas. After all, their specialty is growing healthy trees!

Other Forest

Forest that is not being managed for commercial purposes provides special challenges. The desired future condition for this land must be determined. Then the management decisions and harvest prescriptions can be made to move towards this condition. All the insects and diseases, discussed above under 'commercial forests', will be active in the 'other forest'. The impact (lost vigor and mortality) from these organisms, might be acceptable in the 'other forest'.

Here we have to decide if any trees will be harvested. If so, is Fomes root disease acceptable? And do we want to borax the stumps? Is dwarf mistletoe acceptable? Do we want to remove infested overstory trees?

One decision we don't often make is to leave devastated forest land unplanted. This would usually result in a brush field for hundreds of years, until the forest once again becomes established. Here natural succession would be allowed to occur. Periodic fires would reburn these brushfields creating mosaics in the landscape. Alternatively, we could plant a few seed trees (ie. 10 to 15 trees/acre) to speed up succession. Or, we could plant a low stocking (ie. 50 to 100 trees/acre) and not have to thin. These are all decisions we need to make when dealing with ecosystem management. The choices are many and the tradition guidelines no longer exist. However, we now have the freedom to let natural processes work. This should require less investment. However the price to pay is time. It only takes patience.

I will be available for further assistance, as needed.

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